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# TRANSMITTAL LETTER
## (General - Patent Pending)

Docket No.
**PHN-16.938**

In Re Application Of: **Schylander et al.**

| Serial No. | Filing Date | Examiner | Group Art Unit |
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| **09/315,707** | **05/20/1999** | **Boccio, Vincent F.** | **2615** |

Title: **RECORD CARRIER APPARATUS AND METHOD**



TO THE COMMISSIONER FOR PATENTS:

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**Revised Appeal Brief (in response to Notice of Non-Compliance) - 30 pgs.**

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Dated: **November 10, 2003**

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DOCKET NO. PHN 16,938

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

**Applicants:** **Erik C. Schylander**

**Serial No.:** **09/315,707**

**Filed:** **05/20/1999**

**Examiner:** **Boccio, Vincent F.**

**Art Unit:** **2615**

**For:** **RECORD CARRIER, APPARATUS AND METHOD**



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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

## BRIEF OF APPELLANTS

This revised Appeal Brief, pursuant to the Notice of Appeal filed June 12, 2003 and responsive to the Notice of Non-Compliance with 37 CFR 1.192(c) mailed October 23, 2003, is in support of an appeal from the rejection offfice action rejection dated March 11, 2003.

## REAL PARTY IN INTEREST

U.S. Philips Corporation is the real party in interest.

## RELATED APPEALS AND INTERFERENCES

None.

## STATUS OF CLAIMS

Claims 9-51 are currently pending.

## STATUS OF AMENDMENTS

There are no After-Final Amendments which have not been entered.

## SUMMARY OF INVENTION

The present invention discloses a method and apparatus for reproducing user data (e.g., video-related user data) under control of control data. The apparatus comprises a processor controllable by the control data. The apparatus comprises a record carrier which stores the user data and the control data in digital form. The user data and the control data may be read from the record carrier. See FIG. 1; specification, page 4, lines 1-7.

The control data comprises play control data which defines user data items of the user data which are playable. The control data also comprises selection control data for enabling the user to select user data and control reproduction of the selected user data. The control data additionally comprises variable control data for operating on user and system variables. See specification, page 4, line 32 - page 5, line 4.

The variable control data comprises at least one conditional instruction. Each instruction of the at least one the conditional instruction includes an operation code and operands. The operation code includes an operation portion denoting an operation and a condition portion denoting a condition. The operation is to be executed if the condition is TRUE, and the operation is not to be executed if the condition is FALSE. The operation is adapted to be

performed in conjunction with at least one of said operands. See specification, page 7, line 18 - page 8, line 5.

The at least one instruction is embedded in a Command List comprising a Command List Header which precedes the at least one instruction. See specification, page 7, lines 13-16. The Command List further comprises an unconditional goto which points to a next list to be executed following execution of the Command List, wherein the next list may be another Command List. See specification, page 3, lines 11-14.

The play control data is embedded in Play Lists, the Play Lists comprising at least a Play List Header as a first item and at least one Play Item representing playable user data and at least one reference to a further List. See FIGS. 2a-2b; specification, page 5, line 6 - page 6, line 12.

The selection control data is embedded in Selection Lists, the Selection Lists comprising at least a Selection List Header, at least one reference corresponding to a user selection, the Headers being mutually different. See FIG. 3; specification, page 6, line 13 - page 7, line 11.

The Command List may include a reference to a Play List or a Selection List. See specification, page 7, line 17.

The the operation code and operands of each instruction are stored in a contiguous set of bytes. The operands in an instruction may include indices pointing to elements of an array. The condition denoted in an instruction may includes a dependence on at least one of the indices. An index of the indices may point to an element E of the array subject to is $E>0$, $E<0$, or $E=0$. A first index may point to a first element $E_1$ of the array, wherein a second index may point to a second element $E_2$ of the array, and wherein $E_1>E_2$, $E_1<E_2$, or $E_1=E_2$. The operation denoted in an instruction may be an arithmetic operation, a logical operation, a wait operation, an assignment

operation, or a wait operation. The instruction may includes a constant adapted to be inserted by the instruction into at least one element of an array. The operation denoted in the first instruction may be a jump operation, wherein a jump adapted to be executed by the jump operation is a jump to a list adapted to be next executed. See FIG. 5; specification, page 7, line 18 - page 9, line 10.

## ISSUES

1. Whether claims 9-51 are anticipated by David (WO 98/09290) under 35 U.S.C. 102(b) or, in the alternative, whether claims 9-51 are obvious over David (WO 98/09290) under 35 U.S.C. 103(a).

## GROUPING OF CLAIMS

The claims are grouped as shown in Table 1.

Table 1

| Group | Claims | Do Claims of Group Stand or Fall Together? |
|---|---|---|
| 1 | 9-16, 27-29, 40-41 | Yes |
| 2 | 17-26, 30-39, 42-51 | Yes |

The claims of Group 2 do not stand and fall with the claims of Groups 1 because the claims of Group 2 each include the following feature not present in any of the claims of Group 1: "wherein the operands in a first instruction of the at least one instruction include indices pointing to elements of an array". Additionally, Appellants contend that the preceding feature is a patentable distinction between the claims of Group 2 and the claims of Group 1, since the cited reference of David (WO 98/09290) does not teach or suggest the preceding feature.

## ARGUMENT

**Issue 1**

**CLAIMS 9-51 ARE NOT ANTICIPATED BY DAVID (WO 98/09290) UNDER 35 U.S.C. 102(b) AND CLAIMS 9-51 ARE NOT OBVIOUS OVER DAVID (WO 98/09290) UNDER 35 U.S.C. 103(a)**

Claims 9, 27, and 40

Appellant respectfully contends that independent claims 9, 27, and 40 are not anticipated by David and not obvious over David, because David does not teach or suggest each and every feature of independent claims 9, 27, and 40. For example, David does not teach or suggest the feature: "wherein the variable control data comprises at least one conditional instruction, wherein each instruction of the at least one the conditional instruction includes an operation code and operands, wherein the operation code includes an operation portion denoting an operation and a condition portion denoting a condition, wherein the operation is to be executed if the condition is TRUE, wherein the operation is not to be executed if the condition is FALSE, and wherein the operation is adapted to be performed in conjunction with at least one of said operands".

An examination of David's mechanism for storing and executing instructions will shed light as to why David does not teach or suggest the preceding feature of claims 9, 27, and 40. David's executable instructions are contained in various types of lists as illustrated in FIGS. 5-10 of David and described on page 8, line 26 - page 10, line 34 of David. David's Conditional Lists of FIG. 6, as described on page 9, lines 12-18, relate to the preceding feature of claims 9, 27, and 40 as follows. The conditional instruction syntax shown in FIG. 6 of David includes "operands" having up to 24 bits which represent "a condition portion denoting a condition" required by

claims 9, 27, and 40. However, the conditional instruction syntax shown in FIG. 6 of David does not include "an operation portion denoting an operation" to be performed in dependence on whether operation to be executed or FALSE, as required by claims 9, 27, and 40. In David's scheme, the operation to be executed is not contained within the conditional instruction shown in FIG. 6, but is instead present in another instruction in another list. In the conditional instruction shown in FIG. 6, the operation to be executed is in another list to execute identified by "true_list_offset" if the operation is TRUE, and identified by "false_list_offset" if the operation is FALSE. Appellants note that the language of claims 9, 27, and 40 **requires** that "an operation portion denoting an operation" be included in **the same instruction** that comprises "a condition portion denoting a condition", which David does not teach or suggest. Thus, claims 9, 27, and 40 are not anticipated by David under 35 U.S.C. §102(b), because David does not teach what claims 9, 27, and 40 require.

Likewise, claims 9, 27, and 40 are not obvious over David under 35 U.S.C. §103(a), because to incorporate "an operation portion denoting an operation" into the conditional instruction in the Conditional List of FIG. 6 of David would negate and destroy David's data structure, namely David's list scheme, which underlies David's mechanism for storing and executing instructions. David's data structure and list scheme is the foundation of David's invention. In other words, incorporation of "an operation portion denoting an operation" into the conditional instruction in the Conditional List of FIG. 6 is inconsistent with David's data structure and list scheme, and would effectively destroy David's invention.

Appellant further notes that the Examiner has not presented sufficient analysis to show support how David teaches or suggests the preceding feature of claims 9, 27, and 40; e.g., with

respect to "an operation portion denoting an operation" required to be in the same instruction that comprises "a condition portion denoting a condition" (as explained *supra*) as will be next explained.

The Examiner has not presented arguments to support what he alleges is inherent within the teaching of David with respect to claims 9, 27, and 40. In particular, the Examiner alleges: "It is noted by the examiner that David provides for all as claimed in all the claims and as the examiner has done some of his own programming and realizes, how these statements can be create, used together, therefore, the examiner considers all recited combinations, as being **inherent** combination as intended by the inventor of this reference and what is considered to be well known, programming data structures, can be created with the statements, operators, comparisons , operations, making decisions to branch, through interaction or by default" (emphasis added).

Appellants contend that the preceding allegation of inherency by the Examiner is conclusory. The Examiner has not provided any analysis to support the preceding allegation of inherency and has not provided any reference or citation for support. The Examiner has not provided any argument to support his allegation of inherency with respect to the aforementioned feature of claims 9, 27, and 40. In fact, the Examiner has not even discussed the David's failure to disclose "an operation portion denoting an operation" in the same instruction that comprises "a condition portion denoting a condition". The absence of said argumentation and support by the Examiner makes the rejection of claims 9, 27, and 40 *per se* defective.

Appellants further contend the Examiner's reasoning as to obviousness is circular and likewise conclusory. The Examiner alleges: "it would have been obvious to the those skilled in

the art at the time of the invention with David in from all of themselves, with a careful consideration of what David shows, suggests, that since no argument, or suggestions from David to the contrary, that more complex "If then else", statements as well as other operations as claimed, are considered to be obvious to those skilled in the art, to utilize more complex programming data structures, as is obvious to those skilled in the art. as is well known to those skilled in the art."

Appellants contend that the preceding allegation of obviousness by the Examiner is conclusory. The Examiner has not provided any analysis to support the preceding allegation of obviousness and has not provided any reference or citation for support. The Examiner has not provided any argument to support his allegation of obviousness with respect to the aforementioned feature of claims 9, 27, and 40. In fact, the Examiner has not even discussed the David's failure to disclose "an operation portion denoting an operation" in the same instruction that comprises "a condition portion denoting a condition". The absence of said argumentation and support by the Examiner demonstrates that the Examiner has not established a *prima facie* case of obviousness with respect to claims 9, 27, and 40.

In "Response to Arguments", the Examiner states: "In re page 11, applicant states, in summary, David fails to teach claim 9, 27, 40, having variable control data comprising at least one conditional instruction each instruction of the at least one of the conditional instruction includes an operation code and operands, having an operation and a condition, True or False. In response, the claims utilize, what is considered to be known, suggested or even obvious data structures, throughout all the claims, all considered to be well known generic programming data structure combinations, which the examiner believes is suggested by David, with no suggestion

to the contrary by David." In response, Appellants note again that the preceding statement by the Examiner is conclusory, based only on the Examiner's belief and marked by a conspicuous absence of analysis.

In summary, the Examiner has made vague generalizations about what is known in the art, but has not supplied any argumentation or analysis to apply what he alleges is known in the art to the specific features of claims 9, 27, and 40. Consequently, Appellant contends that the Examiner has failed to satisfy his burden to proof for anticipation and obviousness in relation to claims 9, 27, and 40. In contrast, Appellant (who does not have the initial burden of proof) has supplied concrete and specific arguments as to why claims 9, 27, and 40 are not anticipated by David, and not obvious over David.

Based on the preceding arguments, Appellant contends that claims 9, 27, and 40 are not anticipated by David under 35 U.S.C. 102(b), and are not unpatentable over David under 35 U.S.C. 103(a).

Claims 10, 29, and 41

Since claims 10, 29, and 41 depend from claims 9, 27, and 40, respectively, which Appellants have argued *supra* to be patentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a), Appellants maintain that claims 10, 29, and 41 are not unpatentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a).

In addition, Appellants contend that claims 10, 29, and 41 are not unpatentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a), because David does not teach or suggest the following feature of claims 10, 29, and 41: "wherein the at least one instruction is embedded in a Command

List comprising a Command List Header which precedes the at least one instruction, and wherein the Command List further comprises an unconditional goto which points to a next list to be executed following execution of said Command List".

Additionally, Appellants contend that the rejection of claims 10, 29, and 41 is improper because the Examiner has not provided any argument demonstrating the preceding feature of claims 10, 29, and 41. Indeed, the Examiner has not even discussed the preceding feature of claims 10, 29, and 41

Claim 11

Since claim 11 depends from claim 9, which Appellants have argued *supra* to be patentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a), Appellants maintain that claim 11 is not unpatentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a).

In addition, Appellants contend that claim 11 is not unpatentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a), because David does not teach or suggest the following feature of claim 11: "wherein the next list is another Command List".

Additionally, Appellants contend that the rejection of claim 11 is improper because the Examiner has not provided any argument demonstrating the preceding feature of claim 11. Indeed, the Examiner has not even discussed the preceding feature of claim 11.

Claim 12

Since claim 12 depends from claim 9, which Appellants have argued *supra* to be patentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a), Appellants maintain that claim 12 is

not unpatentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a).

In addition, Appellants contend that claim 12 is not unpatentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a), because David does not teach or suggest the following feature of claim 12: "wherein the next list is not another Command List goto which points to a next list to be executed following execution of said Command List".

Additionally, Appellants contend that the rejection of claim 12 is improper because the Examiner has not provided any argument demonstrating the preceding feature of claim 12. Indeed, the Examiner has not even discussed the preceding feature of claim 12.

Claim 13

Since claim 13 depends from claim 9, which Appellants have argued *supra* to be patentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a), Appellants maintain that claim 13 is not unpatentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a).

In addition, Appellants contend that claim 13 is not unpatentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a), because David does not teach or suggest the following feature of claim 13: "wherein the Command List does not include any other instruction apart from the unconditional goto".

Additionally, Appellants contend that the rejection of claim 13 is improper because the Examiner has not provided any argument demonstrating the preceding feature of claim 13. Indeed, the Examiner has not even discussed the preceding feature of claim 13.

Claim 14

Since claim 14 depends from claim 9, which Appellants have argued *supra* to be patentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a), Appellants maintain that claim 14 is not unpatentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a).

Additionally, Appellants contend that the rejection of claim 14 is improper because the Examiner has not provided any argument demonstrating the following feature of claim 14:"wherein the play control data is embedded in Play Lists, the Play Lists comprising at least a Play List Header as a first item and at least one Play Item representing playable user data and at least one reference to a further List; wherein the selection control data is embedded in Selection Lists, the Selection Lists comprising at least a Selection List Header, at least one reference corresponding to a user selection, the Headers being mutually different; and wherein the Command List includes a reference to a Play List of the Play Lists or a Selection List of the Selection Lists". Indeed, the Examiner has not even discussed the preceding feature of claim 14.

Claim 15

Since claim 15 depends from claim 9, which Appellants have argued *supra* to be patentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a), Appellants maintain that claim 15 is not unpatentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a).

Additionally, Appellants contend that the rejection of claim 15 is improper because the Examiner has not provided any argument demonstrating the following feature of claim 15:"wherein the operation code and operands of each instruction are stored in a contiguous set of bytes". Indeed, the Examiner has not even discussed the preceding feature of claim 15.

Claim 16

Since claim 16 depends from claim 9, which Appellants have argued *supra* to be patentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a), Appellants maintain that claim 16 is not unpatentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a).

Additionally, Appellants contend that the rejection of claim 16 is improper because the Examiner has not provided any argument demonstrating the following feature of claim 16:"wherein the at least one instruction includes a plurality of instructions, and wherein the instructions of the plurality of instructions are adapted to be executed in a coordinated fashion in accordance with a computer program based on an algorithm".

Claims 17, 30, and 42

Since claims 17, 30, and 42 depend from claims 9, 27, and 40, respectively, which Appellants have argued *supra* to be patentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a), Appellants maintain that claims 17, 30, and 42 are not unpatentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a).

In addition, Appellants contend that claims 17, 30, and 42 are not unpatentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a), because David does not teach or suggest the following feature of claims 17, 30, and 42: "wherein the operands in a first instruction of the at least one instruction include indices pointing to elements of an array".

Additionally, Appellants contend that the rejection of claims 17, 30, and 42 is improper because the Examiner has not provided any argument demonstrating the preceding feature of claims 17, 30, and 42. Indeed, the Examiner has not even discussed the preceding feature of

claims 17, 30, and 42.

Claims 18, 31, and 43

Since claims 18, 31, and 43 depend from claims 9, 27, and 40, respectively, which Appellants have argued *supra* to be patentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a), Appellants maintain that claims 18, 31, and 43 are not unpatentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a).

In addition, Appellants contend that claims 18, 31, and 43 are not unpatentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a), because David does not teach or suggest the following feature of claims 18, 31, and 43: "wherein the condition denoted in the first instruction includes a dependence one at least one of said indices".

Additionally, Appellants contend that the rejection of claims 18, 31, and 43 is improper because the Examiner has not provided any argument demonstrating the preceding feature of claims 18, 31, and 43. Indeed, the Examiner has not even discussed the preceding feature of claims 18, 31, and 43.

Claims 19, 32, and 44

Since claims 19, 32, and 44 depend from claims 9, 27, and 40, respectively, which Appellants have argued *supra* to be patentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a), Appellants maintain that claims 19, 32, and 44 are not unpatentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a).

In addition, Appellants contend that claims 19, 32, and 44 are not unpatentable under 35

U.S.C. §102(b) and 35 U.S.C. §103(a), because David does not teach or suggest the following feature of claims 19, 32, and 44: "wherein the operation denoted in the first instruction is an arithmetic operation".

In the office action mailed 09/24/2002, which the Examiner has incorporated by reference into the office action mailed 03/11/2003, the Examiner argues: "the examiner takes official notice that conditional and arithmetic code can be generated used together in addition, can be used on the same statement list or to utilize arithmetic and if then even else statements, used together, as is known in programming data structures, therefore, id David is determined to not suggest the utilization of for example, If then, which is conditional, in combination with arithmetic operators, if x=1 than {perform a calculation}, would have been obvious to programmers {one skilled in the art}, to utilize more complex data programming data structures incorporating conditionals and arithmetic operations, as is well known to those in the art."

In response, Appellant contends that the preceding argument by the Examiner does not overcome Applicant's argument *supra* against obviousness in relation to claims 9, 27, and 40. That is, to incorporate "an operation portion denoting an [arithmetic] operation" into the conditional instruction in the Conditional List of FIG. 6 of David would negate and destroy David's data structure, namely David's list scheme, which underlies David's mechanism for storing and executing instructions. David's data structure and list scheme is the foundation of David's invention. In other words, incorporation of "an operation portion denoting an [arithmetic] operation" into the conditional instruction in the Conditional List of FIG. 6 is inconsistent with David's data structure and list scheme, and would effectively destroy David's invention.

Claims 20, 33, and 45

Since claims 20, 33, and 45 depend from claims 9, 27, and 40, respectively, which Appellants have argued *supra* to be patentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a), Appellants maintain that claims 20, 33, and 45 are not unpatentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a).

In addition, Appellants contend that claims 20, 33, and 45 are not unpatentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a), because David does not teach or suggest the following feature of claims 20, 33, and 45: "wherein an index of said indices points to an element E of said array, and wherein the condition is E>0, E<0, or E=0".

Additionally, Appellants contend that the rejection of claims 20, 33, and 45 is improper because the Examiner has not provided any argument demonstrating the preceding feature of claims 20, 33, and 45. Indeed, the Examiner has not even discussed the preceding feature of claims 20, 33, and 45.

Claims 21, 34 and 46

Since claims 21, 34 and 46 depend from claims 9, 27, and 40, respectively, which Appellants have argued *supra* to be patentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a), Appellants maintain that claims 21, 34 and 46 are not unpatentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a).

In addition, Appellants contend that claims 21, 34 and 46 are not unpatentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a), because David does not teach or suggest the following feature of claims 21, 34 and 46: "wherein a first index of said indices point to a first element $E_1$

of said array, wherein a second index of said indices point to a second element $E_2$ of said array, and wherein the condition is $E_1>E_2$, $E_1<E_2$, or $E_1=E_2$.".

Additionally, Appellants contend that the rejection of claims 21, 34 and 46 is improper because the Examiner has not provided any argument demonstrating the preceding feature of claims 21, 34 and 46. Indeed, the Examiner has not even discussed the preceding feature of claims 21, 34 and 46.

Claims 22, 35 and 47

Since claims 22, 35 and 47 depend from claims 9, 27, and 40, respectively, which Appellants have argued *supra* to be patentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a), Appellants maintain that claims 22, 35 and 47 are not unpatentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a).

Additionally, Appellants contend that the rejection of claims 22, 35 and 47 is improper because the Examiner has not provided any argument demonstrating the following feature of claims 22, 35 and 47: "wherein the operation denoted in the first instruction is a logical operation". Indeed, the Examiner has not even discussed the preceding feature of claims 22, 35 and 47.

Claims 23, 36 and 48

Since claims 23, 36 and 48 depend from claims 9, 27, and 40, respectively, which Appellants have argued *supra* to be patentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a), Appellants maintain that claims 23, 36 and 48 are not unpatentable under 35 U.S.C. §102(b) and

35 U.S.C. §103(a).

Additionally, Appellants contend that the rejection of claims 23, 36 and 48 is improper because the Examiner has not provided any argument demonstrating the following feature of claims 23, 36 and 48: "wherein the operation denoted in the first instruction is an assignment operation" Indeed, the Examiner has not even discussed the preceding feature of claims 23, 36 and 48.

Claims 24, 37 and 49

Since claims 24, 37 and 49 depend from claims 9, 27, and 40, respectively, which Appellants have argued *supra* to be patentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a), Appellants maintain that claims 24, 37 and 49 are not unpatentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a).

In addition, Appellants contend that claims 24, 37 and 49 are not unpatentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a), because David does not teach or suggest the following feature of claims 24, 37 and 49: "wherein the operands in the first instruction further includes a constant adapted to be inserted by the first instruction into at least one element of said array".

Additionally, Appellants contend that the rejection of claims 24, 37 and 49 is improper because the Examiner has not provided any argument demonstrating the preceding feature of claims 24, 37 and 49. Indeed, the Examiner has not even discussed the preceding feature of claims 24, 37 and 49.

Claims 25, 38 and 50

Since claims 25, 38 and 50 depend from claims 9, 27, and 40, respectively, which Appellants have argued *supra* to be patentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a), Appellants maintain that claims 25, 38 and 50 are not unpatentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a).

Additionally, Appellants contend that the rejection of claims 25, 38 and 50 is improper because the Examiner has not provided any argument demonstrating the following feature of claims 25, 38 and 50: "wherein the operation denoted in the first instruction is a jump operation, wherein a jump adapted to be executed by the jump operation is a jump to a list adapted to be next executed" Indeed, the Examiner has not even discussed the preceding feature of claims 25, 38 and 50.

Claims 26, 39 and 51

Since claims 26, 39 and 51 depend from claims 9, 27, and 40, respectively, which Appellants have argued *supra* to be patentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a), Appellants maintain that claims 26, 39 and 51 are not unpatentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a).

In addition, Appellants contend that claims 26, 39 and 51 are not unpatentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a), because David does not teach or suggest the following feature of claims 26, 39 and 51: "wherein the operation denoted in the first instruction is a wait operation".

Additionally, Appellants contend that the rejection of claims 26, 39 and 51 is improper

because the Examiner has not provided any argument demonstrating the preceding feature of claims 26, 39 and 51. Indeed, the Examiner has not even discussed the preceding feature of claims 26, 39 and 51.

Claim 28

Since claim 28 depends from claim 9, which Appellants have argued *supra* to be patentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a), Appellants maintain that claim 28 is not unpatentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a).

In addition, Appellants contend that claim 28 is not unpatentable under 35 U.S.C. §102(b) and 35 U.S.C. §103(a), because David does not teach or suggest the following feature of claim 28: "wherein the processor comprises a single interpreter which is adapted to process the play control data, the selection control data and the variable control data sequentially".

Additionally, Appellants contend that the rejection of claim 28 is improper because the Examiner has not provided any argument demonstrating the preceding feature of claim 28. Indeed, the Examiner has not even discussed the preceding feature of claim 28.

## SUMMARY

In summary, Appellants respectfully request reversal of the March 11, 2003 rejection of claims 9-51 under 35 U.S.C. 102(b) and 35 U.S.C. 103(a).

Respectfully submitted,

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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

**Appellants:** **Erik C. Schylander**

**Serial No.:** **09/315,707**

**Filed:** **05/20/1999**

**Examiner:** **Boccio, Vincent F.**

**Art Unit:** **2615**

**For:** **RECORD CARRIER, APPARATUS AND METHOD**

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Commissioner for Patents

P.O. Box 1450

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## APPENDIX - CLAIMS ON APPEAL

9. A record carrier comprising video-related user data and control data in digital form, wherein the control data enables playback control of the user data, and wherein the control data comprises:

play control data which defines user data items of the user data which are playable;

selection control data for enabling the user to select user data and control reproduction of the selected user data; and

variable control data for operating on user and system variables, wherein the variable control data comprises at least one conditional instruction, wherein each instruction of the at least one the conditional instruction includes an operation code and operands, wherein the operation code includes an operation portion denoting an operation and a condition portion denoting a condition, wherein the operation is to be executed if the condition is TRUE, wherein the operation is not to be executed if the condition is FALSE, and wherein the operation is adapted to be performed in conjunction with at least one of said operands.

10. The record carrier of claim 9, wherein the at least one instruction is embedded in a Command List comprising a Command List Header which precedes the at least one instruction, and wherein the Command List further comprises an unconditional goto which points to a next list to be executed following execution of said Command List.

11. The record carrier of claim 10, wherein the next list is another Command List.

12. The record carrier of claim 10, wherein the next list is not another Command List.

13. The record carrier of claim 10, wherein the Command List does not include any other instruction apart from the unconditional goto.

14. The record carrier of claim 10,

wherein the play control data is embedded in Play Lists, the Play Lists comprising at

least a Play List Header as a first item and at least one Play Item representing playable user data and at least one reference to a further List;

wherein the selection control data is embedded in Selection Lists, the Selection Lists comprising at least a Selection List Header, at least one reference corresponding to a user selection, the Headers being mutually different; and

wherein the Command List includes a reference to a Play List of the Play Lists or a Selection List of the Selection Lists.

15. The record carrier of claim 9, wherein the operation code and operands of each instruction are stored in a contiguous set of bytes.

16. The record carrier of claim 9, wherein the at least one instruction includes a plurality of instructions, and wherein the instructions of the plurality of instructions are adapted to be executed in a coordinated fashion in accordance with a computer program based on an algorithm.

17. The record carrier of claim 9, wherein the operands in a first instruction of the at least one instruction include indices pointing to elements of an array.

18. The record carrier of claim 17, wherein the condition denoted in the first instruction includes a dependence one at least one of said indices.

19. The record carrier of claim 17, wherein the operation denoted in the first instruction is an

arithmetic operation.

20. The record carrier of claim 19, wherein an index of said indices points to an element E of said array, and wherein the condition is $E>0$, $E<0$, or $E=0$.

21. The record carrier of claim 19, wherein a first index of said indices point to a first element $E_1$ of said array, wherein a second index of said indices point to a second element $E_2$ of said array, and wherein the condition is $E_1>E_2$, $E_1<E_2$, or $E_1=E_2$.

22. The record carrier of claim 17, wherein the operation denoted in the first instruction is a logical operation.

23. The record carrier of claim 17, wherein the operation denoted in the first instruction is an assignment operation.

24. The record carrier of claim 23, wherein the operands in the first instruction further includes a constant adapted to be inserted by the first instruction into at least one element of said array.

25. The record carrier of claim 17, wherein the operation denoted in the first instruction is a jump operation, wherein a jump adapted to be executed by the jump operation is a jump to a list adapted to be next executed.

26. The record carrier of claim 17, wherein the operation denoted in the first instruction is a wait operation.

27. An apparatus for reproducing user data under control of control data, comprising a processor controllable by the control data and a record carrier for storing the user data and the control data in digital form, wherein the user data comprising video data, and wherein the control data comprises:

play control data which defines user data items of the user data which are playable;

selection control data for enabling the user to select user data and control reproduction of the selected user data; and

variable control data for operating on user and system variables, wherein the variable control data comprises at least one conditional instruction, wherein each instruction of the at least one the conditional instruction includes an operation code and operands, wherein the operation code includes an operation portion denoting an operation and a condition portion denoting a condition, wherein the operation is to be executed if the condition is TRUE, wherein the operation is not to be executed if the condition is FALSE, and wherein the operation is adapted to be performed in conjunction with at least one of said operands.

28. The apparatus of claim 27, wherein the processor comprises a single interpreter which is adapted to process the play control data, the selection control data and the variable control data sequentially.

29. The apparatus of claim 27, wherein the at least one instruction is embedded in a Command List comprising a Command List Header which precedes the at least one instruction, and wherein the Command List further comprises an unconditional goto which points to a next list to be executed following execution of said Command List.

30. The apparatus of claim 27, wherein the operands in a first instruction of the at least one instruction include indices pointing to elements of an array.

31. The apparatus of claim 30, wherein the condition denoted in the first instruction includes a dependence one at least one of said indices.

32. The apparatus of claim 30, wherein the operation denoted in the first instruction is an arithmetic operation.

33. The apparatus of claim 32, wherein an index of said indices points to an element E of said array, and wherein the condition is $E>0$, $E<0$, or $E=0$.

34. The apparatus of claim 32, wherein a first index of said indices point to a first element $E_1$ of said array, wherein a second index of said indices point to a second element $E_2$ of said array, and wherein the condition is $E_1>E_2$, $E_1<E_2$, or $E_1=E_2$.

35. The apparatus of claim 30, wherein the operation denoted in the first instruction is a logical

operation.

36. The apparatus of claim 30, wherein the operation denoted in the first instruction is an assignment operation.

37. The apparatus of claim 36, wherein the operands in the first instruction further includes a constant adapted to be inserted by the first instruction into at least one element of said array.

38. The apparatus of claim 30, wherein the operation denoted in the first instruction is a jump operation, wherein a jump adapted to be executed by the jump operation is a jump to a list adapted to be next executed.

39. The apparatus of claim 30, wherein the operation denoted in the first instruction is a wait operation.

40. A method of reproducing user data under control of control data comprising:

reading the user data and the control data from a record carrier on which the user data and control data are stored in digital form, wherein the user data comprises video data, wherein the control data comprises play control data, selection control data and variable control data, wherein the selection control data enables a user of the method to select and control reproduction of user data items of the user data, wherein the variable control data controls operates on user and system variables, wherein the variable control data comprises at least one conditional instruction,

wherein each instruction of the at least one the conditional instruction includes an operation code and operands, wherein the operation code includes an operation portion denoting an operation and a condition portion denoting a condition, wherein the operation is to be executed if the condition is TRUE, wherein the operation is not to be executed if the condition is FALSE, and wherein the operation is adapted to be performed in conjunction with at least one of said operands; and

playing the user data under control of the play control data.

41. The method of claim 40, wherein the at least one instruction is embedded in a Command List comprising a Command List Header which precedes the at least one instruction, and wherein the Command List further comprises an unconditional goto which points to a next list to be executed following execution of said Command List.

42. The method of claim 40, wherein the operands in a first instruction of the at least one instruction include indices pointing to elements of an array.

43. The method of claim 42, wherein the condition denoted in the first instruction includes a dependence one at least one of said indices.

44. The method of claim 42, wherein the operation denoted in the first instruction is an arithmetic operation.

45. The method of claim 44, wherein an index of said indices points to an element E of said array, and wherein the condition is $E>0$, $E<0$, or $E=0$.

46. The method of claim 44, wherein a first index of said indices point to a first element $E_1$ of said array, wherein a second index of said indices point to a second element $E_2$ of said array, and wherein the condition is $E_1>E_2$, $E_1<E_2$, or $E_1=E_2$.

47. The method of claim 42, wherein the operation denoted in the first instruction is a logical operation.

48. The method of claim 42, wherein the operation denoted in the first instruction is an assignment operation.

49. The method of claim 48, wherein the operands in the first instruction further includes a constant adapted to be inserted by the first instruction into at least one element of said array.

50. The method of claim 42, wherein the operation denoted in the first instruction is a jump operation, wherein a jump adapted to be executed by the jump operation is a jump to a list adapted to be next executed.

51. The method of claim 42, wherein the operation denoted in the first instruction is a wait operation.

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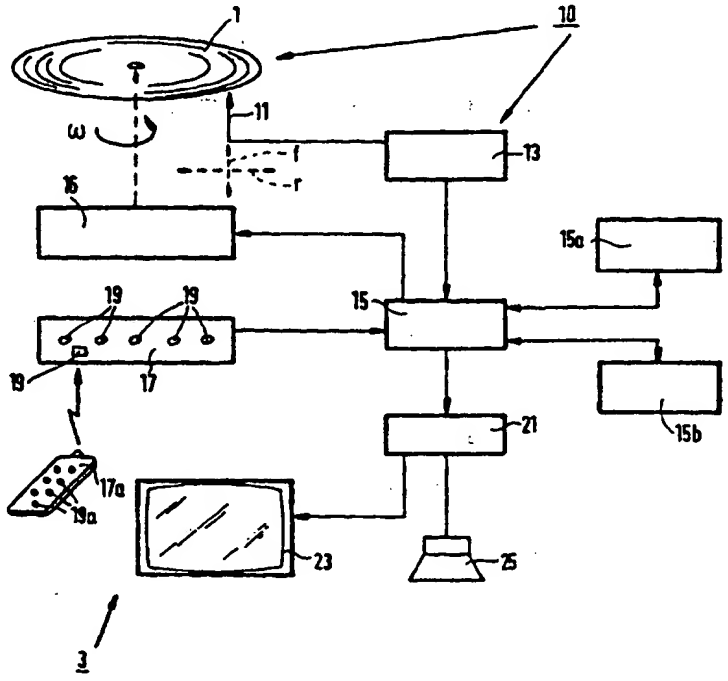
(57) Abstract

A record carrier and apparatus for reproducing audio/video information stored on said record carrier are described, which by use of control structures stored on said disc and cooperating with the playback control mechanism enable a flexible and interactive control and display of the audio/video information. The processing power of the processor for said playback control is kept restricted and the complexity of the control structures are low. These structures include list such as: Play-, Regional Play-, Selection-, Statement-, Conditional-, Control- and Change Volume Lists. These lists enable interactive control, creation of wait loop for receiving user input, default actions or sequences, operation on variables and system variables to reproduce of audio/video information under certain settings of the player, such as conditional playback, multi channel sound, language selection, subtitle electron, etc.



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| ML | Mali |
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# PLAYBACK CONTROL IN DIGITAL VIDEO DISC PLAYERS

The invention relates to an apparatus capable of reproducing audio and/or video and/or data information from a record carrier, on which the information has been stored in digital form and is directly accessible, the apparatus being provided with control means for enabling the user to select and control a presentation of an audio/video program to be read from the record carrier to be or being read by said apparatus, which control means comprise a computer program controlled processor and the computer program comprises at least a first and a second control structure, of which the first structure defines play items of audio/video data that are playable in sequence and the second structure defines at least branching in the sequence of play items upon user input control.

The invention relates furthermore to a record carrier storing audio and/or video and control data, which control data enable playback control of the audio/video data wherein the control data are organized in a playback control mechanism, which comprises at least two control structures, of which a first structure defines play items of audio/video data that are playable in sequence and a second structure defines at least branching in the sequence of play items upon user input control.

A playback apparatus, such as an optical disc player and a record carrier such as an optically readable disc storing audio/video information are well known in the prior art under the names Video CD Player and Video CD Disc respectively. The Video CD Player comprises control means, which upon certain user command input reads control data from the Video CD Disc so as to realize functions such as "Playback", "NEXT", "PREVIOUS", "RETURN", "STOP" and controls playback of the relevant desired audio/video information accordingly.

Although the playback control of the Video CD System enables adequate playback control of the Video CD Discs the complexity of it increases if the number of play items that are added together so as to create a long uninterrupted sequence of display items, which are to be displayed.

Further the flexibility of well as interactivity during the playback are limited within the Video CD System. The complexity of the play back control will increase if more flexibility or interactivity in control is desired.

It is an object of the invention to provide an apparatus having an improved control structure providing extended possibilities for reproducing audio/video information from record carriers.

It is a further object of the invention to provide an apparatus having improved interactive control possibilities for reproducing audio/video information from record carriers.

It is another object of the invention to provide a record carrier, on which have been stored control data so as to provide extended possibilities for playback of said audio/video information.

It is still a further object of the invention to provide a record carrier, on which have been stored control data, so as to provide an improved interactive playback control of the audio/video information of said record carrier.

It is still another object of the invention to provide an optical disc player and record carrier, which enable more possibilities and/or interactivity for control and still show a rather low degree of complexity in control software for the optical disc player and data file structure on the record carrier.

An optical disc player in accordance with the invention is characterized in that the first structure comprises a play list per single play item, which play list includes a seamless continus flag, which, if set, indicates that the end of the play item on the record carrier the next play item starts in the next sector of the record carrier, and that at least one of further control structures is provided, which is selected from the control structures: Regioned Play List, Statement List, Conditional List, Control List, Set Stream ID List, Enable Stream ID List, Change Volume List.

An optical readable disc in accordance with the invention is characterized in that the first structure comprises a play list per single play item, which play list includes a seamless continus flag, which, if set, indicates that the end of the play item on the record carrier the next play item starts in the next sector of the record carrier, and that at least one of further control structures is provided, which is selected from the control structures: Regioned Play List, Statement List, Conditional List, Control List, Set Stream ID List, Enable Stream ID List, Change Volume List.

This record carrier has the advantage that the record carrier enables seamless continuous play of successive items and the branching mechanism of the second structure can be simplified due to the fact that a play list comprises a single play item, said play list needs just to include one single offset data to find each time the list to execute the

previous Next or Return function respectively upon the user command inputs: Previous, Next or Return respectively.

The invention will be further elucidated and explained by use of the following drawings, which show various embodiments in a non-limitative way of example. Now

Figure 1 shows an embodiment of an apparatus in accordance with the invention;

Figures 2a and 2b show the syntax of a first control structure: the Play List;

Figures 3a and 3b show the syntax of a control structure kindlike to the first control structure: the Regioned Play List;

Figures 4a and 4b show the syntax of a second control structure: the Selection List;

Figure 5 shows the syntax of the fourth control structure: the Statement List;

Figure 6 shows the syntax of a fifth control structure the Conditional List;

Figure 7 shows the syntax of the sixth control structure: the Control List;

Figures 8a, b and c show two further control structures: the Set Stream ID List and the Enable Stream ID List;

Figure 9 shows another embodiment of a control structure: the Change Volume List and

Figure 10 shows an embodiment of another control structure: the End List.

An optical disc player system 10 in accordance with the invention has been shown in Figure 1. The system 10 comprises a record carrier 1 and a record player 3. The record carrier 1 is e.g. an optical disc comprising digital audio/video/data information in an embossed information layer. This information is to be read out by use of an optical stylus 11 (known as such) which supplies the detected data to a decoding and error correcting means 13. The decoded and error corrected data are supplied to a processor 15, which cooperates with a ROM memory 15a and a RAM memory 15b to control and operate on the data flow received from decoding and error correcting means 13. A first task of the controller 15 is to provide control signals, such as velocity control tracking and focusing control signals to the servo system 16. The servo system 16 controls the angular velocity $\omega$ of the rotating disc 1 as well as the position of the optical stylus 11 with respect to the track

of the optical disc 1, which has been shown by the dotted arrow r. Further the servo system 16 controls the focusing of the optical stylus, such that the bright bundle emitted by the laser is focused on the information layer of the optical disc (which has been shown by the dotted arrow f).

A second task of the processor 15 is to control the audio and video bit stream to the dedicated decoders 21, which decode the e.g. MPEG2 coded video and audio and supply the decoded video to a display 23 and the decoded audio to a speaker or speaker system 25 (e.g. a multi channel sound system).

The information to be reproduced by the display 23 and sound system 25 is selectable by user input, which is received e.g. by direct control of selection buttons 19 of the input means 17 of the optical disc player 3 or via a remote control device 17a having selection buttons 19a. Of course, other possibilities of control are available and adequate, such as but not limited to: voice control, control via a direct link to a personal computer or via a telephone modem etc.

The processor 15 of the shown embodiment can be a relatively low power microcontroller having 1 MIPS capacity. It is possible to have the video and audio MPEG2 decoding realised by a software controlled processor 15, which then should be a high speed high power process unit equipped with adequate amounts of RAM and ROM memory 15a and 15b.

The syntax of the first control structure: the Play- List has been shown in Figure 2a. The Play List describes a part of a program that is to be played and comprises pointers to other control structures (lists), that will be executed on user interaction and when the end of a Play Item of the Play List concerned is realised.

The semantics of the Play List are as follows:

play_list_header: a one byte code that identifies the beginning of a Play List;

prev_list_offset: offset to the list to execute on the "Previous" function;

next_list_offset: offset to the list to execute on the "Next" function. In a Play List this field shall always contain a valid list offset;

return_list_offset: offset to the list to execute on the "Return" function;

wait_time: the time to wait at the end of the Play Item. When the seamless-continuous flag is set to one this field shall have the value zero. The numeric value of the Wait Time field is a measure for the number of seconds, during which a user can give input while the display item is displayed.

Seamless-Continue is a one bit flag and when set it indicates that at the end of the Play Item,

a next Play Item is to be displayed immediately and is located in the sector after the current Play Item.

There have been defined three Default Regions for the Play List. The displayed image is divided preferably in three equal widths regions each of full picture height. The regions are assigned to the functions "Previous", "Return" and "Next" and preferably reading from left to right. When a pointing device upon being positioned due to user input via input device 17 or remote controller 17a in one of said regions and activated the appropriate function will be performed.

The Play Item syntax has been shown in Figure 2b and is straight forward.

The Start Address is the logical sector address to start from so a to reproduce the information concerned.

The End Address is the logical sector address of the last sector in the Play Item.

The stopping STC will cause termination of the Play Item when the top 32 bits of the STC reach the value represented.

The syntax of a control structure kindlike to the Play List is shown in Figure 3a. The Regioned Play List is the same as a Play List but with the addition of regions. These regions are used to define areas of the picture as hotspots for navigation functions upon user input. These areas are preferably of rectangular shape.

The Regioned Play List Semantics are the same as those for the Play List, but the additions show the following:

prev_region(): an area on the screen representing a hotspot for the "Previous" function.
next_region(): an area on the screen representing a hotspot for the "Next" function.
return_region(): an area on the screen representing a hotspot for the "Return" function.

The Regions describe a rectangular area of the picture. The top left hand corner of the picture has e.g. the co-ordinates (0,0). The lower right hand corner of the picture has e.g. the co-ordinates (255,255).

Regions may overlap. In such situation the order in which regions appear in a list define their priority and the last region has preferably a higher priority than the first. If all fields in a region are set to zero, the region is inactive. If a list offset has the extreme value $FFFF its associated region shall be set to zero. If a list offset does not have the value $FFFF it associated region shall not be zero. The syntax to define a region has been shown in Figure

3b. The Region semantics are as follows:

top_left_x: the top left hand X co-ordinate of the region.
top_left_y: the top left hand Y co-ordinate of the region.
bottom_right_x: the bottom right hand X co-ordinate of the region.
bottom_right_y: the bottom right hand Y co-ordinate of the region.

A second control structure to cooperate with the Play List and Regioned Play List is the Selection List. Selection Lists are used to offer choices to the user and to take action based on the user's input. For instance, Selection Lists can be used to implement menus. The Selection List Syntax has been shown in Figure 4a. The Selection List Semantics are as follows:

selection_list_header: defines the start of a Selection List.
num_of_selections (NOS): the total number of selections in the list.
prev_list_offset: see Play List Semantics.
next_list_offset: see Play List Semantics. } (Figure 2a)
return_list_offset: see Play List Semantics
default_list_offset: offset to the list to execute on the "Default Selection" function.
timeout_list_offset: offset to the list to execute if there has been no user interaction after all the iterations of the Play Item and after the time defined in the wait_time field.
wait_time_: see Play List Semantics. } (Figure 2a)
seamless_continue: see Play List Semantics
jump-timing: defines how the Play Item is terminated when user chooses the "Default Selection" or a numeric selection is made. Values for this field are either 0 or 1: If the jump timing flag has the value 0, then terminate the Play Item immediately and execute the appropriate list. If the flag has the value 1 then wait for the current iteration of the Play Item to finish and then execute the appropriate list.

loop_count: the number of times to loop the Play Item. Values for loop_count are any number between and including 0 and 63. Thereby the value 0 means: infinite wait which is used to obtain e.g. a mandatory input of the user.
play_item(): see the definition of Play Item (Figure 2b).
prev_region(): a region of the picture representing a hotspot for the "Previous" function.

next_region(): a region of the picture representing a hotspot for the "Next" function.
return_region(): a region of the picture representing a hotspot for the "Return" function.
default_region(): a region of the picture representing a hotspot for the "Default Selection" function.
selection(): a selection option. This selection option is used to match user input, either in the form of numeric keypad selections or via a hotspots on the picture to a list. The Selection Syntax has been shown in Figure 4b.
The Selection Semantics are as follows:

value: the numeric value for this selection.
list_offset: offset to the list to execute when this selection is matched.
region(): the hotspot for this selection (see e.g. Figure 3b).

A fourth control structure is the Statement List, which is used to operate on variables. The Statement List Syntax is shown in Figure 5. The Statement List Semantics are as follows:
statement_list_header: identifies the start of a Statement List and the operation to be carried out on the operands.
operands: the operands for the operation defined by statement_list_header.
next_list_offset: offset to the next list to execute.

The variable to operate upon the Statement List are: user variables or system variables. The system variables can be a.o. is shown in the subsequent List.
Default country
Default language
Enhanced subtitle status
Simple subtitle status
LPCM audio status
MPEG-2 multi-lingual audio status
MPEG-2 extension audio status
MPEG base audio status
Rating status
Player capability
Calculation status
There are 32 user read-rewritable variables numbered 0-31. On start up all user variables are initialized to zero. User variables are signed quantities.

The System variables described the state of the playback system and provide a means to change that state. The Default Country variable holds the ISO 3166 country code for the default country of the player. If the default country is unknown or undefined this variable shall be set to zero. The Default Language variable holds the ISO639 code for the default language of the player. If the default language is unknown or undefined this variable shall be set to zero. The Elementary Stream Status variables describe information about each type of elementary stream. The Rating Status variable describes which rating definition levels, as defined in a disc Table of Content (TOC) have been enabled. The use of a TOC is known as such. When the Rating Status variable is set to one then this flag indicates that rating definition level is enabled for the player. If the enabled rating levels of the player are unknown or undefined this variable shall be set to zero.

The Player Capability variable describes the decoding capabilities of the player, such as:

display_type(): describes the type of displays that the player is capable of supporting e.g. PAL of NTSC.

enhanced_subtitle: when set to one this flag indicates the player is capable of decoding enhanced subtitle streams;

simple_subtitle: when set to one this flag indicates the place is capable of decoding simple subtitle streams;

lpcm_audio: when set to one this flag indicates the player is capable of decoding LPCM streams or that the player has a digital output for these streams;

mpeg_multilingual-audio: when set to one this flag indicates the player is capable of decoding MPEG-2 multi-lingual streams or that the player has a digital output for these streams;

mpeg-extension-audio: when set to one this flag indicates the player is capable of decoding MPEG-2 extension streams or that the player has a digital output for these streams.

The Calculation Status variable holds information about the result of the last arithmetic operation to be carried out by a Statement List. This result may be:

- overflow: if set to one this flag indicates there was an arithmetic overflow. This implies the result was not representable in the operand size; Cleared otherwise;
- carry; if set to one this flag indicates that a carry was generated out of the most significant bit of the operands for an addition. Also set if a borrow is generated in a substraction; Cleared otherwise.

The operation that can be carried out by the statement list include but are not limited to:

- comparisons

- assigning a value to a variable
- additions
- substraction
- multiply
- divide
- logic operation: OR; AND; EX-OR
- assigning random values to a variable
- modulus calculation

etc.

Another type of control structure is the Conditional List. Conditional Lists offer an "if-then-else" type of construction. A condition is tested and either a true or false list is executed. The Conditional List Syntax is shown in Figure 6. The Conditional List Semantics are as follows:

conditional_list-header: defines the start of a Conditional List and which type of condition to check;

operands: the operands for the condition as defined by conditional_list_header;

true_list_offset: offset to the list to execute if the condition is true;

false_list_offset: offset to the list to execute if the condition is false.

A further type of a control structure is the Control List. The Control List is used to select stream identifications and to enable and disable stream decoding. The Control List Synntax is shown in Figure 7. The Control List Semantics are as follows:

control_list_header: identifies the start of a Control List.

next_list_offset: offset to the next list to execute;

enhanced_subtitle: controls the decoding of enhanced subtitles;

simple_subtitle: controls the decoding of simple subtitles;

lpcm_audio: controls the decoding of LPCM audio;

mpeg_multi_lingual: controls the decoding of MPEG-2 multi-lingual audio

mpeg_multi_channel: controls the decoding of MPEG-2 multi-channel audio

mpeg_base_audio: controls the decoding of MPEG base stream audio.

The meaning of the control byte for each elementary stream type can be: channel select, Enable, Disable, No Action.

A further control structure is the Set Stream ID List. The Set Stream ID list is used to set the stream identification for an elementary stream from a variable. The Set Stream ID List Syntax is shown in Figure 8a.

The Set Stream ID List Semantics are given here below.

set_stream_id_list_header: identifies the start of a Set Stream ID list and which type of stream to set. The meanings of the values for this field can be as follows: Enhanced subtitle, Simple subtitle, LPCM audio, MPEG-2 multi-lingual audio, MPEG-2 extension audio or MPEG base audio.

variable_id: the variable to read the stream identification form;

next_list_offset: the offset to the next list to execute.

A control structure to be used in combination with the Set Stream ID List is the Enable Stream ID list. The Enable Stream ID List is used to set which streams are available for user selection. The Enable Stream ID List Syntax is shown in Figure 8b. The Enable Stream ID List Semantics is given herebelow:

enable_stream_id_list_header: identifies the start of an Enable Stream ID list and which type of stream the enable map applies to. How this field identifies stream types is given in the subsequent list: Enhanced subtitle, Simple subtitle, LPCM audio, MPEG-2 multi-lingual audio, MPEG-2 extension audio; MPEG base audio.

next_list_offset: offset to the next list to execute.

enable-map(): bitmap of which streams to enable.

The Enable Map Syntax is shown in Figure 8c. The Enable Map Semantics are as follows:

enable_steam_s: enable decoding of stream s.

Another embodiment of a control structure is the Change Volume List. The Change Volume List is used to instruct the player to switch to another disc within the current album. Such is necessary if the volume of information exceeds the quantity of information that can be stored on a single disc. The Change Volume List Syntax is shown in Figure 9. The Change Volume List Semantics are as follows:

change_volume_list_header: identifies the start of the Change Volume list.

loop_count: number of times to loop the Play Item, which can be a number between and including 0 and 255. The number 0 means an indefinite number of loops.

prev_list_offset: offset to the list to execute on the "Previous" function;

return_list_offset: offset to the list to execute on the "Return" function;

next_disc_num: sequence number of the destination disc within the album;

next_disc_list_offset: offset of the list to execute on the destination disc;

play_item(): this Play Item is played if the next disc is not found. This will happen in a single disc player or if the next disc is not in the tray of a multi-disc player.

A mandatory control structure is the End List. The End List signals the end of the playback control. The End List Syntax is shown in Figure 10. The End List Semantics are as follows:

end_list_header: identifies the start of an End List.

It has been shown by the above that by combination of several or all control structures a flexible and interactive control is achieved without creating too high level of complexity. A too high level is complexity would demand a processor 15 with more processing power, more software and the creation of a program on a disc also would be more demanding on effort in man and machine power.

CLAIMS:

1. An apparatus capable of reproducing audio and/or video and/or data information on a record carrier, on which the information has been stored in digital form and is directed accessible, the apparatus being provided with control means for enabling the user to select and control a presentation of an audio/video program to be read from the record carrier to be or being read by said apparatus, which control means comprise a computer program controlled processor and the computer program comprises at least a first and a second control structure, of which the first structure defines play items of audio/video data that are playable in sequence and the second structure defines at least branching in the sequence of play items upon user input control, characterized in that the first structure comprises a play list per single play item, which play list includes a seamless continus flag, which, if set, indicates that the end of the play item on the record carrier the next play item starts in the next sector of the record carrier.

2. A record carrier storing sectorwize audio and/or video and control data which control data enable playback control of the audio/video data, characterized in that the first structure comprises a play list, per single play item which play list includes a seamless continue flag indicating that at the end of the play item on the disc the next play item starts in the next sector of the record carrier and that at least one of further control structures is provided, which is selected from the control structures: Regioned Play List, Statement List, Conditional List, Control List, Set Stream ID List, Enable Stream ID List, Change Volume List.

3. A record carrier as claimed in Claim 2, characterized in that the playback control mechanism comprises a third control structure (the regioned play list), which is similar to the play list and further includes at least one region specification, which defines a user selectable area in an image of a display item under control of this third control structure and a user selectable function to be performed for the playback of audio/video data upon selection of said area, thereby each region defines a different function.

4. A record carrier as claimed in Claim 2 or 3, characterized in that the playback control mechanism comprises a further control structure (the Statement List) which is used to operate on variables being either system variables or user variables, the system

variables defining parameters and default settings for playback of the information on the record carrier.

5. A record carrier as claimed in Claim 4, characterized in that the system variables comprises at least one of the following items: Default Country Variable, Default Language Variable, Elementary Stream Variable, Rating Status Variable, Player Capability and Calculation Status Variable.

6. A record carrier as claimed in one of the Claims 2 to 5, characterized in that the playback control mechanism comprises another control structure (Conditional List), which causes to execute either a first or a second action upon either a first or second action upon the "true" or "false" result of a condition test.

7. A record carrier as claimed in one of the Claims 2 to 6, characterized in that the playback control mechanism comprises a still further control structure (Control List), which is used to select data stream identifications and to enable or disable said data stream decoding.

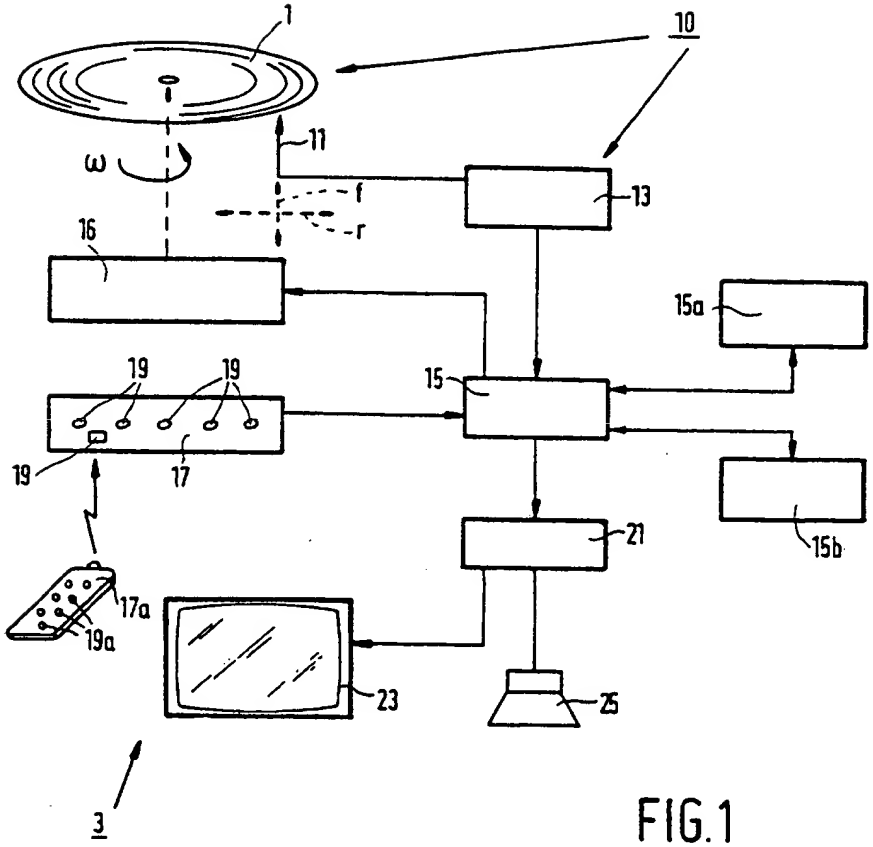


FIG.1

| Syntax | No. of Bits |
|---|---|
| play_list(){ | |
| play_list_header | 8 |
| prev_list_offset | 16 |
| next_list_offset | 16 |
| return_list_offset | 16 |
| wait_time | 8 |
| seamless_continue | 1 |
| reserved | 7 |
| play_item() | |
| } | |

FIG.2 a

| Syntax | No. of Bits |
|---|---|
| play_item(){ | |
| start_address | 32 |
| end_address | 32 |
| stopping_stc | 32 |
| } | |

FIG.2 b

| Syntax | No. of Bits |
|---|---|
| play_list(){ | |
| regioned_play_list_header | 8 |
| prev_list_offset | 16 |
| next_list_offset | 16 |
| return_list_offset | 16 |
| wait_time | 8 |
| seamless_continue | 1 |
| reserved | 7 |
| play_item() | |
| prev_region() | |
| next_region() | |
| return_region() | |
| } | |

FIG.3 a

| Syntax | No. of Bits |
|---|---|
| region(){ | |
| top_left_x | 8 |
| top_left_y | 8 |
| bottom_right_x | 8 |
| bottom_right_y | 8 |
| } | |

FIG.3 b

| Syntax | No. of Bits |
|---|---|
| selection_list(){ | |
| selection_list_header | 8 |
| num_of_selections (NOS) | 8 |
| prev_list_offset | 16 |
| next_list_offset | 16 |
| return_list_offset | 16 |
| default_list_offset | 16 |
| timeout_list_offset | 16 |
| wait_time | 8 |
| seamless_continue | 1 |
| jump_timing | 1 |
| loop_count | 6 |
| play_item() | |
| prev_region() | |
| next_region() | |
| return_region() | |
| default_region() | |
| for(s=0;s<NOS;s++){ | |
| selection() | |
| } | |
| } | |

FIG.4a

| Syntax | No. of Bits |
|---|---|
| selection(){ | |
| value | 8 |
| list_offset | 16 |
| region() | |
| } | |

FIG.4b

| Syntax | No. of Bits |
|---|---|
| statement_list(){ | |
| statement_list_header | 8 |
| operands | 32 |
| next_list_offset | 16 |
| } | |

FIG.5

| Syntax | No. of Bits |
|---|---|
| conditional_list(){ | |
| conditional_list_header | 8 |
| operands | 24 |
| true_list_offset | 16 |
| false_list_offset | 16 |
| } | |

FIG.6

| Syntax | No. of Bits |
|---|---|
| control_list(){ | |
| control_list_header | 8 |
| next_list_offset | 16 |
| enhanced_subtitle | 8 |
| simple_subtitle | 8 |
| reserved | 8 |
| lpcm_audio | 8 |
| mpeg_multi_lingual | 8 |
| mpeg_audio_extension | 8 |
| mpeg_audio_base | 8 |
| } | |

FIG.7

| Syntax | No. of Bits |
|---|---|
| set_stream_id_list(){ | |
| set_stream_id_list_header | 8 |
| variable_id | 8 |
| next_list_offset | 16 |
| } | |

FIG.8a

| Syntax | No. of Bits |
|---|---|
| enable_stream_id_list(){ | |
| enable_stream_id_list_header | 8 |
| next_list_offset | 16 |
| enable_map() | |
| } | |

FIG.8b

| Syntax | No. of Bits |
|---|---|
| enable_map(){ | |
| for(s=31;s>=0;s--){ | |
| enable_stream_s | 1 |
| } | |
| } | |

FIG.8c

| Syntax | No. of Bits |
|---|---|
| change_volume_list(){ | |
| change_volume_list_header | 8 |
| loop_count | 8 |
| prev_list_offset | 16 |
| return_list_offset | 16 |
| next_disc_num | 16 |
| next_disc_list_offset | 16 |
| play_item() | |
| } | |

FIG.9

| Syntax | No. of Bits |
|---|---|
| end_list(){ | |
| end_list_header | 8 |
| } | |

FIG.10

# INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB 96/00875

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: G11B 27/10, G11B 27/32 // H04N 5/85
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: G11B, H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CLAIMS, WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| Y | EP 0689206 A1 (SONY CORPORATION), 27 December 1995 (27.12.95), page 5, line 49 - page 21, line 37 | 1,2 |
| A | -- | 3-7 |
| Y | EP 0528425 A2 (SONY CORPORATION), 24 February 1993 (24.02.93), column 3, line 16 - column 7, line 8 | 1,2 |
| A | -- | 3-7 |
| A | EP 0542377 A2 (PHILIPS ELECTRONICS UK LIMITED), 19 May 1993 (19.05.93), column 8, line 28 - column 14, line 5 | 1-7 |
| | -- | |

[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
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"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
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| Date of the actual completion of the international search | Date of mailing of the international search report |
|---|---|
| 26 May 1997 | 28 -05- 1997 |
| Name and mailing address of the ISA/<br>Swedish Patent Office<br>Box 5055, S-102 42 STOCKHOLM<br>Facsimile No. +46 8 666 02 86 | Authorized officer<br>Bo Gustavsson<br>Telephone No. +46 8 782 25 00 |